~~vehicle will have [sufficiently travelled after exiting]~~ travelled the predetermined distance from the sensor area, wherein the predetermined distance is chosen such that the vehicle will [so as to] have substantially no influence ~~on~~ the frequency of the oscillator signal;

taking a sample measurement ~~of~~ the frequency of the oscillator at the time [that was determined ~~to be~~ sufficient to allow the] after vehicle [to] exit from the sensor area; ~~and~~

~~adjusting the reference value based upon the sample measurement.~~

In claim 7, line 13, please delete "a said" and insert therefor --the--.

REMARKS

Reconsideration of this application in light of the above amendments and the following remarks is respectfully requested. Claims 1-13 are pending in the application. Claims 1-5 and 7 have been amended.

§112 Rejections

Paragraph 1 of the Office Action rejected claims 1-4 under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, "exit of a said vehicle" has been changed to "exit of the vehicle from the detection area". Applicant respectfully requests that the rejection of claims 1-4 under 35 U.S.C. §112, second paragraph, be withdrawn.

§102 Rejections

Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by Koerner et al. ('339). Claims 1-13 were rejected under 35 U.S.C. §102(b) as being anticipated by Alexander. Applicant respectfully traverses these rejections.

The problem addressed by the presently claimed invention is described at page 2, line 11 to page 3, line 8, which state:

> If the vehicle detector has an incorrect reference value, errors in detection may occur. These errors may result in vehicles over the sensor not being detected, vehicles being detected when the sensor area is actually empty, and a single vehicle being detected as multiple vehicles.

> Vehicle detectors in use today use relatively blind approaches to adjusting the reference value in an attempt to track oscillator frequency changes caused by the environment rather than by vehicles. The methods ... include: adjusting the reference value toward the current measurement by a fixed amount during each fixed time interval. . . . Each of these approaches results in a high probability that the reference value will be set to the wrong value, particularly during heavy traffic when it is most important that it be set correctly.

The Koerner '339 reference uses one of these "blind" approaches to adjust the reference value in their attempt to correct for changes in the oscillator frequency caused by environmental conditions. The Office Action refers to col. 1, lines 20-28, col. 6, lines 19-32 and col. 6, lines 30-32 of the Koerner '339 reference as teaching the claimed steps of calculating a time after vehicle exit from the detection area and adjusting the reference value based upon the comparison between the measured value and the reference value. However, Koerner '339 merely determines when the vehicle enters and when it exits the detection area, and compares a measured value during that time frame to a historical measurement. The historical measurement is then adjusted using the "blind" approach of adjusting the historical value toward the current measurement value by one count (see Koerner '339 col. 16, lines 21-26 and col. 16, lines 33-39). Thus, although Koerner '339 does detect when the vehicle enters and when it exits the detection area, it is only concerned with samples taken during that time frame. Koerner '339 does not take an additional sample of the oscillator frequency at a <u>later</u> time, not at the point in time at which the vehicle exits the detection area, but rather at the point in time where it has been determined to be a sufficient distance away from the detection area so as not to affect the oscillator signal, as is recited in claim 1. In addition, because Koerner '339 does not sample the oscillator signal at this calculated time, it necessarily does not include the claimed steps of determining the speed of the vehicle and using the speed to calculate the time at which the sample measurement should be taken. It is therefore respectfully submitted that claim 1 is patentable over the Koerner '339 reference.

Similarly, the Alexander reference does not include all the elements recited in claims 1-13. With respect to independent claims 1 and 5, the Office Action refers to col. 3, lines 118-129 of the Alexander reference as teaching the step of

calculating a time after which the vehicle will have sufficiently traveled so as not to affect the oscillator signal. Applicant respectfully submits, however, that col. 3, lines 118-129 of the Alexander reference refer only to the detection of when the vehicle enters and when it exits the detection area. The claimed invention also detects the time at which the vehicle enters and exits the detection area. In contrast and in addition, however, the invention recited in independent claims 1 and 5 also samples the oscillator signal at a later time after vehicle exit from the detection area. Again, this time is chosen, and is claimed, to be the point at which the vehicle is sufficiently away from the detection area so as not to influence the period of the oscillator signal. The claimed point in time when this sample is taken corresponds to when the vehicle has travelled a predetermined minimum distance away from the detection area. It is therefore respectfully submitted that independent claims 1 and 5 are patentable over the Alexander reference.

With respect to dependent claims 2-4 and 6, these claims recite more specifically how the time of vehicle exit is calculated by determining a time rate of change of inductance and a magnitude of change of inductance, calculating therefrom the vehicle speed (claim 2); how the reference value is adjusted (claim 3); setting the reference value equal to an average of a plurality of sample measurement values (claim 4); and very specifically how the reference value is adjusted (claim 6). Because Alexander does not teach any of the above described claimed steps, claims 1-6 are respectfully submitted to be allowable over Alexander.

With respect to independent claims 7 and 8, these claims recite the steps of connecting the oscillator to a dummy sensor having inductance which is not affected by vehicles, measuring the frequency of the oscillator signal while the connected to the dummy sensor, comparing the frequency to a previously measured frequency of the dummy sensor, and determining a change in the measured frequency and thus recognizing the frequency change as an indication of environmental change. The sensors taught by Alexander are all affected by the presence of vehicles. Thus, the Alexander reference does not teach the step of connecting the oscillator to a dummy sensor having inductance which is not affected by the presence of vehicles, and thus also does not teach the remaining steps which use the measurements of the dummy sensor. Claims 7 and 8 are

therefore respectfully submitted to be allowable over Alexander.

With respect to claims 9 and 10, these claims recite the step of calculating a time rate of change of the inductive sensor, and from this, identifying mechanical difficulties when the time rate of change is within a certain range. The Alexander reference similarly does not teach these claimed steps, and is nowhere concerned specifically with the detection of changes in the oscillator signal caused by mechanical difficulties. Claims 9 and 10 are therefore submitted to be allowable over Alexander.

With respect to claims 11-12, claim 11 recites that the adjustment of the new reference value is based upon a comparison of an average change in a plurality of measured values with the threshold change. Claim 12 more particularly recites that an average change in the measured value is added to the reference value to thereby change the threshold. These features are not taught by the Alexander reference and claims 11-12 are therefore submitted to be allowable over Alexander.

With respect to claim 13, the step is recited to estimate the maximum drift rate as a fraction of the oscillator period during a maximum time period. It is respectfully submitted that the Alexander reference does not teach the estimation of a maximum drift rate, and thus further does not teach any of the remaining steps recited in claim 13. It is therefore respectfully submitted that claim 13 is allowable over the Alexander reference.

In view of the above amendments and remarks, Applicant respectfully submits that the Koerner '339 reference does not teach all elements recited in claim 1, and that the Alexander reference does not teach all elements recited in claims 1-13. Applicant therefore respectfully requests that the rejections of claims 1-13 under 35 U.S.C. §102(b) be withdrawn.

§103 Rejections

Claim 5 was rejected under 35 U.S.C. §103 as being unpatentable over Koerner et al. ('339). The Office Action (referring back to paper number 3) states that although Koerner '339 does not teach the steps of taking a sample measurement of the frequency of the oscillator at the time that was determined to

be sufficient to allow the vehicle to exit the sensor area, it would have been obvious to one of ordinary skill in the art to do this because a more accurate reference value can be generated based upon the sample measurement of the frequency of the oscillator. Applicant respectfully traverses this rejection.

In addition to not teaching or suggesting the above described elements, the Koerner '339 reference does not teach or suggest the claimed steps of measuring the vehicle speed based upon a rate of frequency change and a magnitude of frequency change of the oscillator signal. Because these steps are not taught or suggested by the Koerner '339 reference, it is respectfully submitted that claim 5 is patentable over Koerner '339.

Applicant, therefore, respectfully requests that the rejection of claim 5 under 35 U.S.C. §103 over Koerner be withdrawn.

CONCLUSION

In light of the above amendments and remarks, Applicant respectfully submits that the claims as amended are in condition for allowance. Applicant therefore respectfully requests a favorable Action on the merits.

Please direct any inquiries to the undersigned attorney at (612) 736-7176.

Respectfully submitted,

Date April 18, 1994

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April 18, 1994

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